AVRVi Ethernet IO Kit

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File Version V1.0

AVR and Virtual Instrument
www.avrvi.com

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1、Introduction

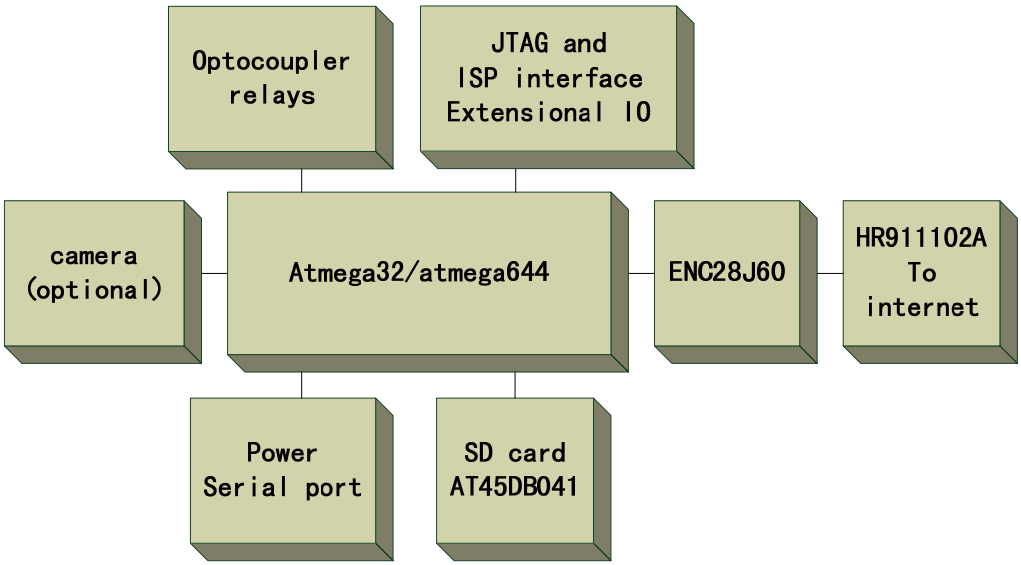
1.1 System Introduction

AVRVi Ethernet IO Kit MCU Internet Suite is designed by AVRVI which is looked at Germany in an open-source project. It is combined AVR Chip ATmega32 with ENC28J60 to achieve the function of the MCU Device access the internet. Low-cost, rapidly start, simply develop. It is an excellent tool for start MCU to internet.

This package provides a wealth of peripherals, onboard 4M flash and SD card socket,RS232,relays,optocouplers,instructions LED,RES232,etc.AT the same time it can be used as a AVR development board for the AVR chip with abundant resources, AD, EEPROM, Timers.

1.2 System Architecture

This system consists of the core MCU ATmega32 or ATmega644 plus the network chips network ENC28J60 and network transformers HR9111102A , and equipped with SD cards and AT 45DB041 for storage, the standard JTAG and ISP interfaces, and has extensional IO, optocoupler, relay, power supply, serial and other functions.



1.3 Resource Characteristics

Master Chip: Default ATmega32L-8AU, It can be extended into ATmega644L-8AU increase 10CNY.

Network chips: Microchip’s ENC28J60, SPI interface, small size.

To achieve an agreement: TCP / IP protocol, HTTP protocol, web authentication, FTP, UDP, ARP, ICMP.

Hardware resources:

- Extended 4M AT45DB041, it is easy for users to store date and code pages.
- Extended SD card, FAT file system can be done(there are card connector on board, SD card optional)
- 10M-100M adaptive Ethernet port
- 1 road standard serial port RS232
- 2 road 2A SPDT relay outputs.
- 2 Road, P521 optocoupler Input
- 8 way 10bit AD convert input
- reserved SPI Interface
- reserved TWI interface
- reserved PWM interface
- FKC terminals, connect way of industrial products
- Standard JTAG interface
- Standard ISP Interface

Software Resources:

- Provide a complete Web Server source code to compile GCCAVR
- Provide two versions of the software:mega32 and mega644
- Provide a complete schematic diagram
- Provide UIP0.9 core transplantation (to achieve the conversion from TCP data to RS232)
- Provide AVR studio and GCCAVR Software which is needed for development.
- To provide the complete information on German open-source project AT2626.
- To provide ENC28J60 and Mega32, and related device data sheet Chinese
- To provide network transformers and ENC28J60 Protel Component storehouse.
- To provide the Microchip official TCPIP protocol stack and application manuals
- There are instructions for software to compile a detailed explanation of the process and the description of the various parts of software functions.

1.4 Packing List

1、Web development board (with shell)
2、one 7.5 V power supply
3、one standard straight cable
4、one standard serial cable
5、one data CD-ROM (schematic diagram, data manual, correlation information, etc.)

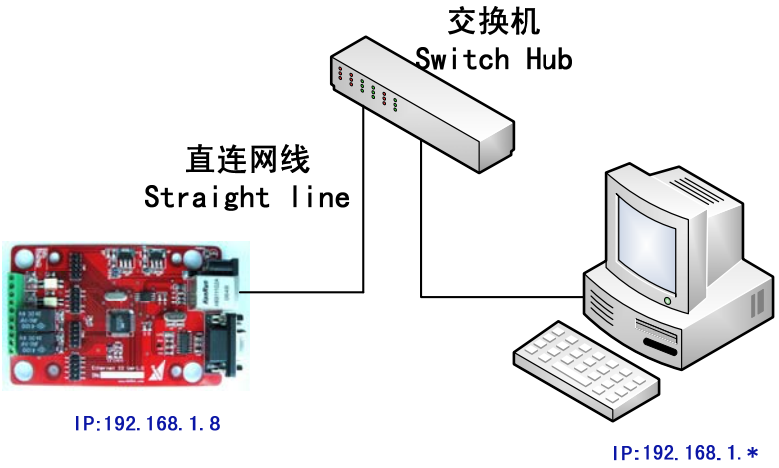
2、Quick Start

2.1 Development Board Test

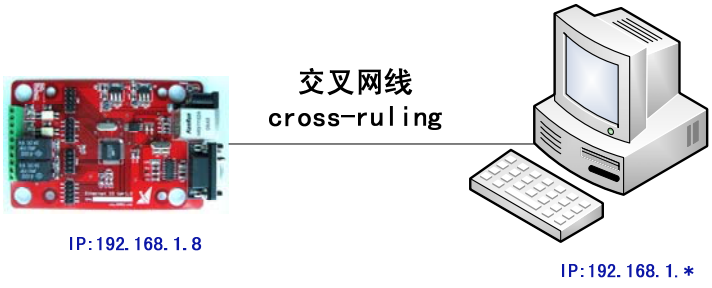
There has been written testing procedures and tested well in development board in default. You can observe the running effect with the following steps:

a) LAN is composed by the development board and computer.
   i. Using of the direct Internet line (in packaging) to connect the development board and a computer to the same LAN, such as the testing diagram A.
   ii. Directly connecting the development board and computer using the crossover cable(required to bring their own), such as the testing diagram B
b) Using the supporting power to supply electricity for the development board
c) Changing the IP into192.168.1.
d) Running Ping 192.168.1.8, then you can ping development board.
e) Typing http://192.168.1.8 through the browser to visit website
f) Through the SET IO page clicking on or off can control the relay.
g) Management page the user name: admin ,password:1eth1

The use of direct Internet line (packaging that is assigned) will be developed through the switch board and a computer connected to the same LAN, such as the testing diagram of A

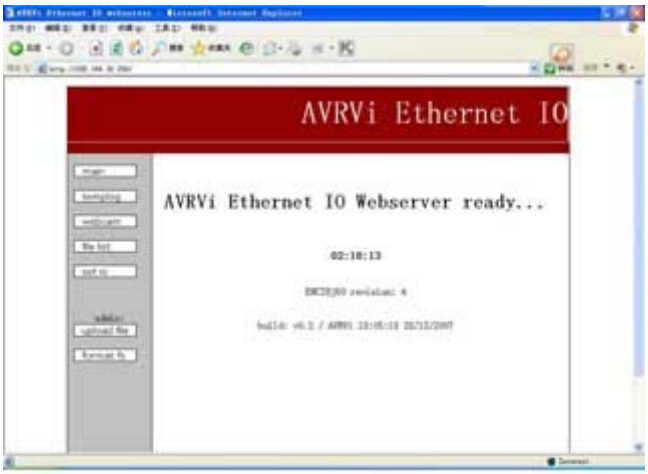


Testing diagram A



Testing diagram B

If the setting is successful, you can see the following in browser:



WEB server index

2.2 Development Environment build

Hardware environment：

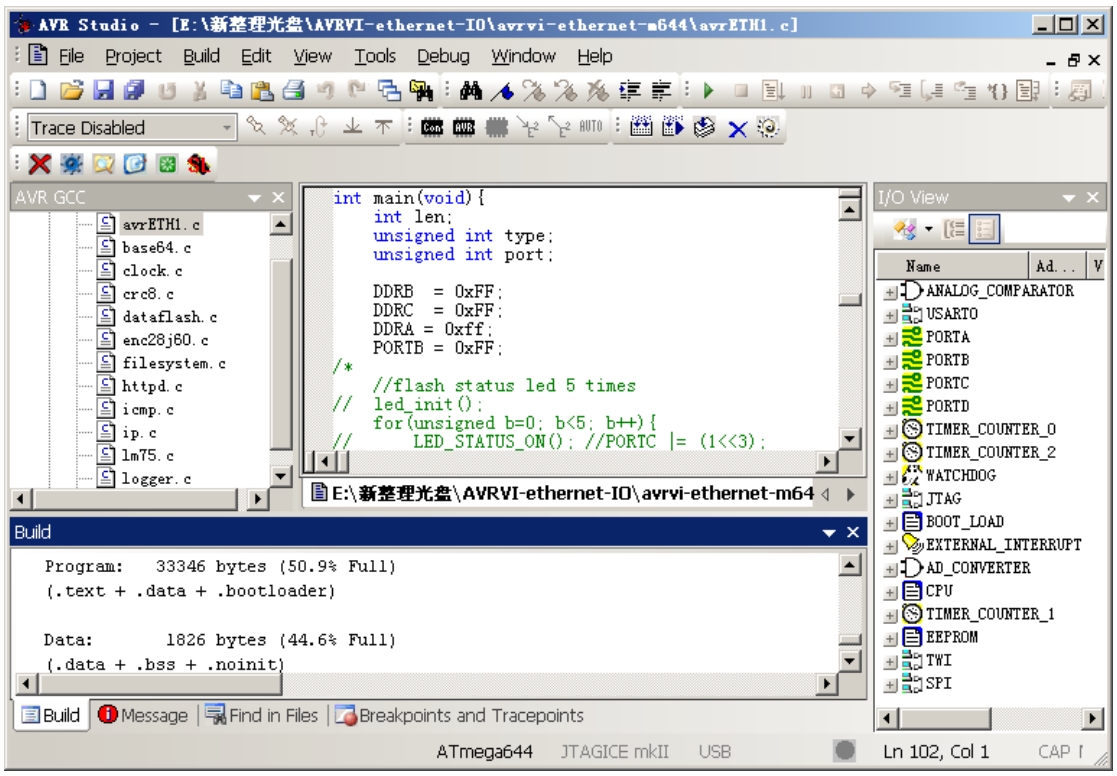
a) computer and network
b) There is no emulator or programmer in Development Kit, you need to bring their own, if not you can select one from our website, we recommend the tool which can support both emulator and programming, it is convenient for development.

Software Environment:

a) AVR studio 4.13 B528 CD-ROM contains installation files
b) Winavr 20070525 CD-ROM contains installation files
c) Installing directly.

A. Compiling the program：

The operation method is that using AVRstudio to open the corresponding directory avrETH1.aps, modifying the program to compile. And it provides two versions: ATmega32 and ATmega644.If you do not compile, you can find the file in the default directory avrETH1.hex then burn directly.



Note that it can be compiled after be installed Winavr and AVRstudio. There will be some warning during the compilation process, but it does not affect using.

B. Download and Simulation:

Please refer to the instructions of emulator or programming, modifying the program and the debugging process cycle.

C. Description of procedural changing:

/config.h Changing IP addresses, passwords and other physical address and other configuration information, pay attention to the program does not support dynamic IP, does not support the access to certification, it will be unavailable if it is not a static IP.

/build.h modifying the version program compiled and it will be shown below the web page.

/net/httpd_data.c modifying the contents to change displays in the page.

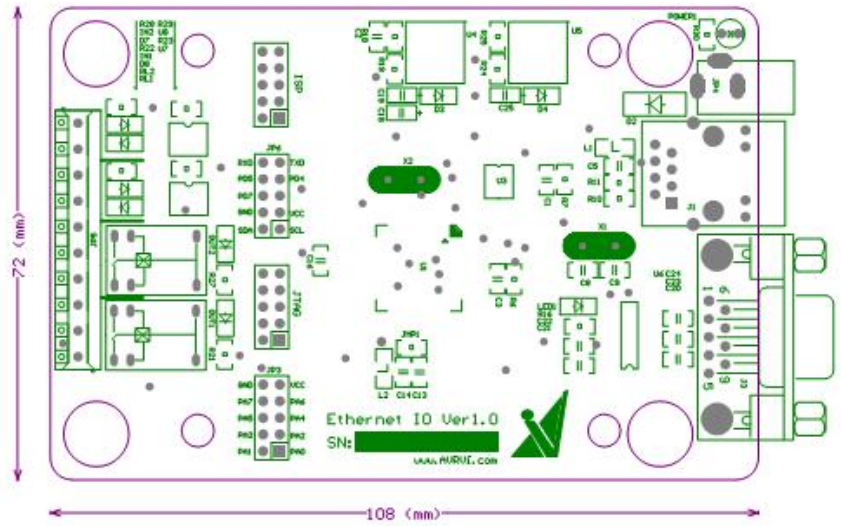
/io/ There are hardware-related procedures under the folder, please adjust the related content if modity the hardware.

/io/mca25 It is camera-related content. The related procedures have been commented out as standard with no camera. If need to use, you need to enable the program-related programs.

Please do your own research on other information.

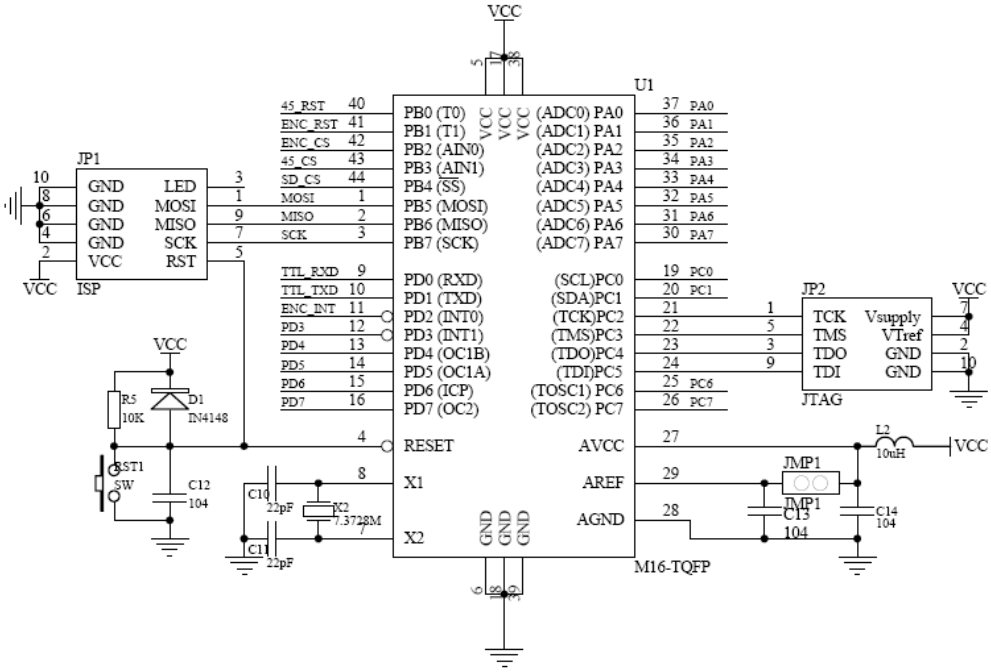
3、Hardware Description

General layout of the various is functional hardware as the following figure, SD cards and ENC28J60 chips are at the back of the board.



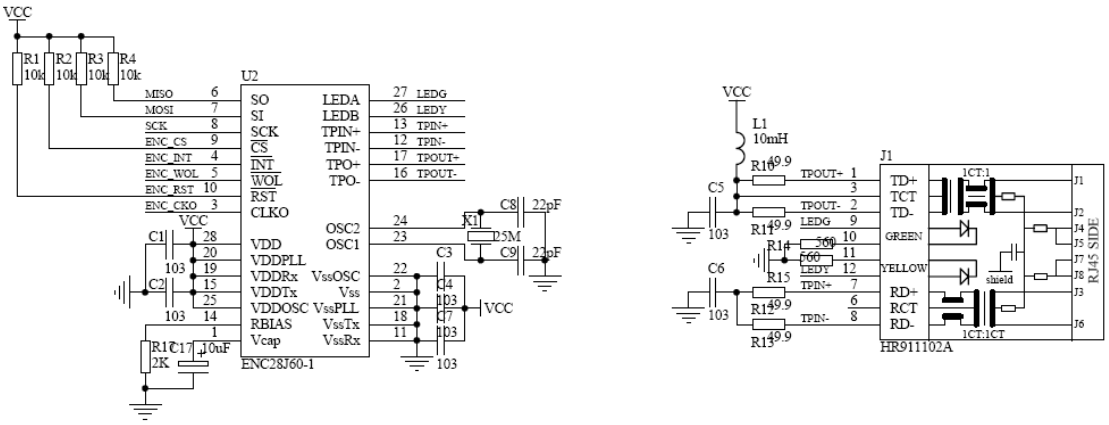
3.1 Minimum System Core of AVR MCU

There are ISP interface, JTAG interface, reset circuit, crystal oscillator circuit, AD converter reference source circuit in this section, as the following picture:



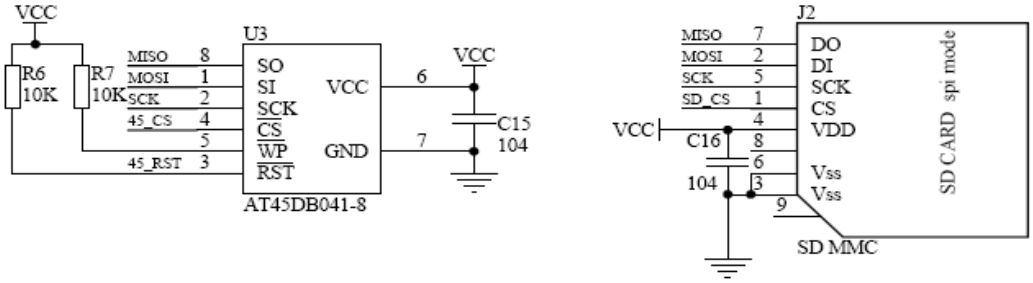
3.2 Parts of the Network Circuit

This is the core of the development board, using a combination of ENC28J60 and HR911102A, through the SPI interface to MCU, Data sheet is used to connect a typical application circuit design. Please note that there will be appropriate space of ENC28J60 for heat dissipation in the actually design.



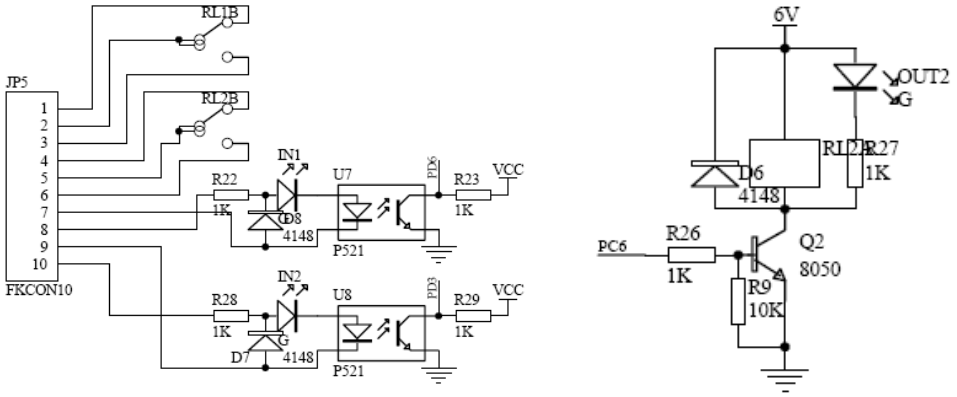
3.3 SD Card and AT45DB041 to store

There has been designed a 4M serial FlashAT45DB041 and SD card interfaces on the development board. It can be used to store web documents, set up FAT32 file system, etc. They are connected to the SPI interface, the connection diagram is as follows.



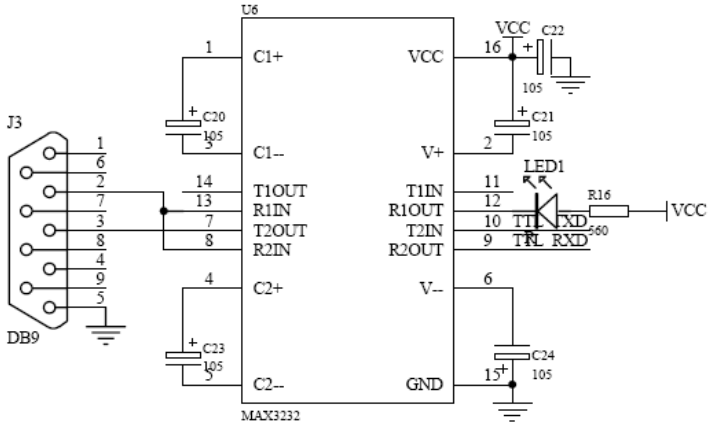
3.4 Optocoupler and relay

Optocoupler is used for network testing IO. Relay is used for network remote control; it is designed by standard circuit, as the following two diagrams.



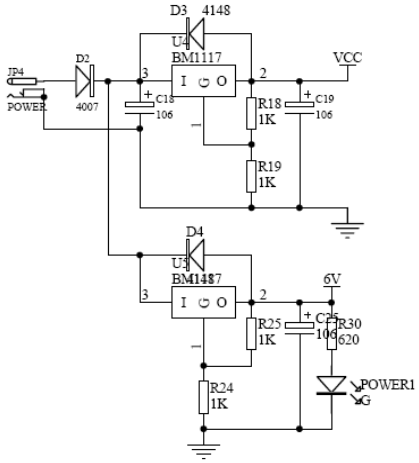
3.5 Serial Communication Circuit

Serial Communication Circuit is the Max232 design, pay attention that the development board is as the primary equipment. It is designed for its next-bit machine, if required the connection with computer, using the crossover cable.



3.6 Power section

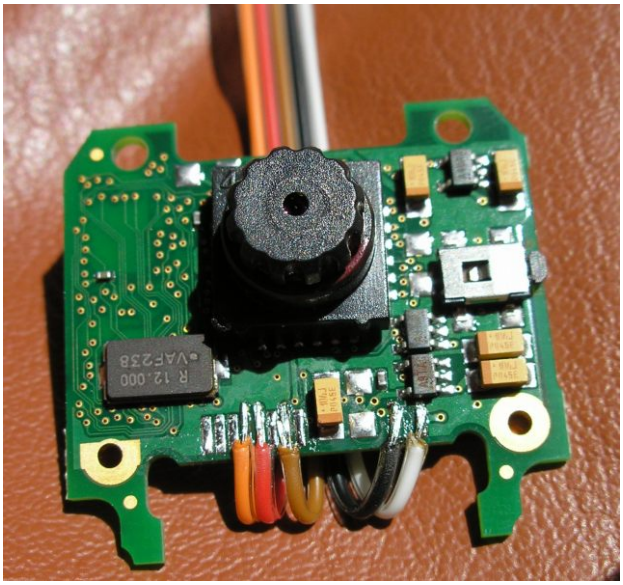
As two kinds of voltage of 6V, and 3.3V is needed for the system, the system uses two-way 1117-ADJ for regulators, output 6V and 3.3V.The application circuit is consistent, but the parameters are different.



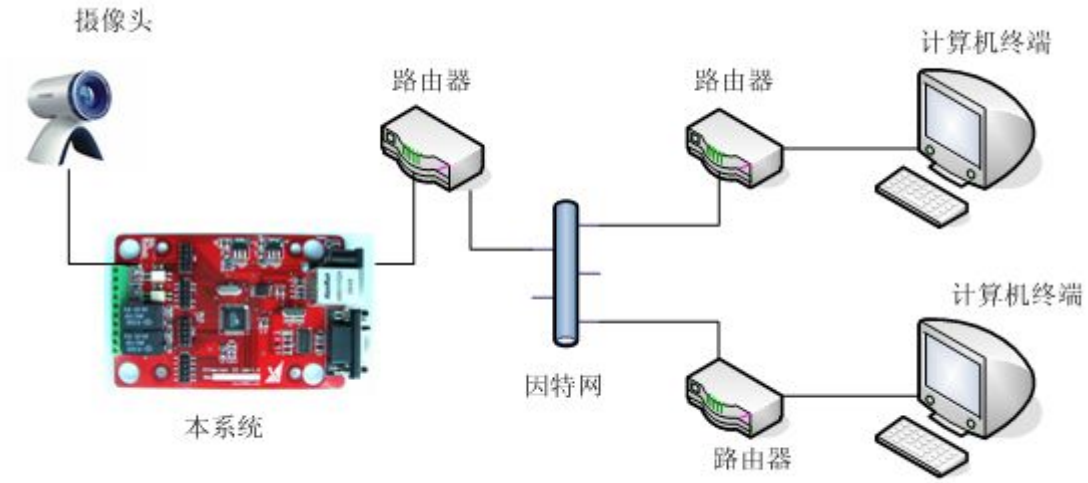
3.7 About using of camera

This system can support camera pictures. There is a brief introduction about the MAC25 connection method, as the following description and pictures, it need to connect the RXD, TXD, control pin, as well as power supply, The function is only for enthusiast researching.

1 NC
2 NC
3 NC
4 Cameras TX --RXD
5 Cameras RX --TXD
6 NC
7 Accessory Control -- To IO
8 NC
9 NC
10 GND
11 VCC (3,4-4,2 V)



System block diagram about the camera is as follow:



4. Service and support

Technology support:

AVRVi website：http://www.avrvi.com
http://www.avrvi.net
AVRVi forum: http://bbs.avrvi.com
AVRVi shop: http://shop.avrvi.com
Support emails: support@avrvi.com avrvi@hotmail.com

When ask for help, please supply follow information:

1. Your order information
2. Your AVR Studio version, you can see detail in AVRstudio help menu.
3. The programmer's model number, you can see it at the back of programmer.
4. Detail description for your problem and question.

Warranty terms

1. Service time: A moth exchange, One year warranty.
2. Free warranty: Under the correct use of quality problem, free warranty
3. Warranty with charge: Damage by improperly use, we need charge for repair.
4. If need shipping cost, it pay by customers.

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